

NEW RECORDS AND NOTES CONCERNING *CASTILLEJA SPIRANTHOIDES*  
(SCROPHULARIACEAE)

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ABSTRACT

Newly identified collections of the little-known *Castilleja spiranthoides* are documented, and a summary of its morphology, ecology, distribution and possible relationships is provided. This species appears to be an anomalous member of sect. *Castilleja*, with its nearest relative probably being *Castilleja ctenodonta*.

KEY WORDS: *Castilleja*, *Castilleja spiranthoides*, *Castilleja ctenodonta*, Scrophulariaceae, chromosome numbers, Sinaloa, México

*Castilleja spiranthoides* Standley is a distinctive but little known taxon previously reported only from the type collection (*Ortega 6896* [F!]), made in the vicinity of Los Gusanos, San Ignacio in south-central Sinaloa. Its description by Standley (1936) contains only the Latin description, the collection number, the location cited above and the sparse collection notes, "in dry soil, March 1931". Since that time references to *C. spiranthoides* appear to be absent from the botanical literature.

Recently, a review of undetermined collections of Mexican *Castilleja* from the herbaria of ASU and ARIZ revealed three additional collections of *Castilleja spiranthoides*, extending its known range at least 70 km to the southeast. More importantly, they provide additional insight into the morphology and possible relationships of this rather unusual species within *Castilleja*.

The three newly identified collections, all from Sinaloa, México are as follows:

1. Near El Batel, along highway from Mazatlán to Durango, mixed oak and pine forest with steep southerly slopes, elevation 5,000 to 6,000 ft., 6 February 1952, *Gentry 11562* (ARIZ!). The specimen label also contains the notation, "annual with red flowers". This sheet holds four complete plants. Unpublished collection records in Gentry's hand list the collection date as 5 February 1952 and include the locality notation of "Palmito-Batel, Sinaloa" (P. Jenkins, ARIZ, pers. comm.). A duplicate of this collection is deposited at MICH and was independently identified as *Castilleja spiranthoides* by G.L. Nesom in 1992 (Nesom, pers. comm.).

2. Just west of El Palmito, Rancho El Liébré, pine forest hillside and deep barranca, elevation ca. 7,000 ft., 13 March 1980, *Lehto 24384* (ASU!). This sheet holds four complete plants and two partial stems.

3. About 1 mi. north of Mexican Highway 40, between Villa Unión and Ciudad Durango, about 5 miles west of Durango state border, elevation ca. 7,600 ft., 14 March 1985, *Daniel 4028* (ASU!). This sheet holds two complete plants. The specimen label also provides the notation, "Bracts reddish; occasional."

In addition, a fourth new collection of *Castilleja spiranthoides* is deposited at UCR, according to notes and photographs of the collection on file at UC(!). This sheet was annotated as *C. spiranthoides* by L.R. Heckard in 1992. The original citation is as follows: Rancho Libre Barranca, 2 air miles northwest of El Palmito, north of Hwy. 40 and very near the Durango state line, 27 March 1984, *Sanders 4903*. Additional notes by the collector indicate that the plants occurred in cloud forest on north slopes in pine/oak vegetation on exposed ridges and that the plants were "fairly common in duff under pines". The annotation by Heckard also notes that the calyx is divided more deeply in front than behind and that the lobes of the lower lip of the corolla are infolded.

While the Latin description by Standley appears to accurately represent the plants in the newly identified collections, a few additional and potentially diagnostic characters are apparent in these plants. The plants represented in the collections of Lehto and Daniel are vigorous specimens in prime flowering condition, and the measurements from these plants for all vegetative and flowering parts are consistently and proportionately larger than are those found in the holotype or in the Gentry collection, which appear to possess somewhat depauperate and/or desiccated inflorescences. Measurements from the description by Standley (1936) of the type collection more closely resemble those of the Gentry collection. Whether these differences are due to ecological conditions or to natural variation among healthy plants is unknown. However, it is clear that all five of these collections are of a single species. The following notes are based upon Standley's description combined with data from the newly identified collections and are intended to supplement Standley's type description of *Castilleja spiranthoides*:

Plants annual; stems 25-35 cm tall, mostly simple, erect, slender and densely villosulous with gland-tipped hairs; leaves numerous, crowded and ascending below, becoming shorter, widely spaced, erect, and with a finely sinuate-margined apex above, 15-50 mm, entire, linear and narrowly acuminate, sessile to subclasping but not at all auriculate, villosulous with gland-tipped hairs; inflorescence at first a subcapitate spike, the internodes elongating with age; bracts (15-)20-24 mm long, usually entire (occasionally with several short, acuminate, apiculate teeth) greenish basally, becoming pink to light red-purple above with prominent dark red-purple veins, bluntly ensiform to narrowly pandurate with a rounded, sinuate-margined, petaloid tip, moderately to densely villosulous with gland-tipped hairs; calyx (10-)18-27 mm long, entirely pink to red-purple with prominent dark red-purple veins, sparsely stipitate-glandular, tube 2-3 mm wide for most of its length, then widening to 3-5 mm near the base of the lobes, abaxial cleft 12-16 mm long, adaxial cleft 6-8 mm long, with secondary clefts 2-4 mm long, narrowly acuminate, slightly unequal, often falcately upturned; corolla (12-)20-30 mm long with tube and beak of about equal length, only slightly exceeding the calyx in length but often at least partially exerted

outward from the abaxial calyx cleft, mostly glabrate, tube pale, beak becoming entirely reddish except for a pale green and shortly bearded dorsal surface, lower lip of three dark greenish, incurved teeth, 1.0-1.5 mm in length.

*Castilleja spiranthoides* appears to flower during most of February and March, although the full duration of the flowering period has yet to be determined. Little is known of its ecology, although it is now known to occur in pine-oak forests on steep slopes between 1,500-2,300 m. It appears to be a rare endemic to the western slopes of the Sierra Madre Occidental in southeastern Sinaloa, but it likely occurs in adjacent western Durango as well. The locations of all four of the newly identified collections cited above are within a few kilometers of each other in the vicinity of the botanically well-explored highway from Mazatlán to the Durango border. Also, it seems likely that the range of *C. spiranthoides* may be more or less continuous from the vicinity of the type collection to the area of the new collections, as the intervening mountainous terrain provides similar habitat but is relatively inaccessible and poorly known botanically.

The relationships of *Castilleja spiranthoides* within the genus remain somewhat unclear. Based on coloration and morphology of the inflorescence, this species is surely a member of subg. *Castilleja*, as defined by Chuang & Heckard (1991). More equivocally, its irregularly cleft and conspicuously colored calyx, somewhat pendulously exerted corolla, and relatively long corolla beak appear to place *C. spiranthoides* within sect. *Castilleja*, as defined by Holmgren (1976) and by Nesom (1992). However, neither of these authors includes *C. spiranthoides* among the sect. *Castilleja* found within their area of treatment. This apparent oversight may be due to the paucity of specimens of this species previously available for comparative study. Nesom (pers. comm.) now considers *C. spiranthoides* to be a member of sect. *Castilleja*, based on calyx and corolla morphology.

While it does appear to belong to sect. *Castilleja*, *Castilleja spiranthoides* is a rather anomalous member of that group, with the only other annual species apparently being *Castilleja filiflora* Nesom, a limited endemic from Chiapas, México (Nesom 1992) that is unlike *C. spiranthoides* in a number of morphological features. The species to which *C. spiranthoides* is perhaps most closely related and which it most resembles in form, leaf arrangement, vestiture, coloration, and numerous features of the inflorescence is the rarely collected *C. ctenodonta* Eastwood. Apparently, *C. ctenodonta* is known only from a few collections made in the vicinity of the type locality in the Sierra de Clavellinas in Oaxaca, although, as Nesom (1992) pointed out, *C. ctenodonta* is very closely related also to the Guatemalan endemic species, *C. alorum* Standley & Steyermark. Eastwood's (1909) description of the type of *C. ctenodonta* indicates that this is a perennial species, although its stems are very slender and apparently rhizomatous in the specimens I have seen, including an isotype of *Pringle 4986* (UC!) and two sheets of *Smith 539* (NY!, UC!). *Castilleja ctenodonta* differs from *C. spiranthoides* most strongly in that both the leaves and bracts of *C. ctenodonta* have short, narrow, nearly pectinate divisions and that the bracts are not at all apically pandurate.

Some aspects of the morphology of *Castilleja spiranthoides* are atypical of sect. *Castilleja*. In such features as its annual duration, basally clumped but then more widely spaced, upright to erect cauline leaf arrangement, often sinuate-margined upper leaves and bracts, and often pandurate bract shape, *C. spiranthoides* more closely resembles some species of sect. *Euchroma* (Nutt.) Benth., such as *C. macrostigma* Robinson and *C. ornata* Eastwood. However, the calyx and corolla morphology of *C. spiranthoides* appear to preclude its placement in that group. Both additional field

work, and chromosomal and biochemical analyses of this species would be desirable in sorting out its evolutionary relationships.

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